

What is claimed is:

1. A method for controlling a signal path in an optical transmission system, comprises:

15 the path provision step of providing a subscriber service path in the form of first and second service signal paths;

the step of detecting a fail by periodically checking the first and second service paths; and

10 the step of carrying out a conventional auto path protection function if the first service signal path has a fail, or carrying out a new auto path protection function through a message communication channel included in the overhead of a STM-n signal if the second service signal path has a fail.

2. The method according to claim 1, wherein the first service signal path is a path for providing voice and low-speed data services, and the second service signal path is a path for providing high-speed and very high-speed data services.

3. The method according to claim 1, wherein the first service signal path supports a through path and an add-drop path in the system of the terminal operation mode and ADM operation mode, respectively, and further supports a through path and a ring add-drop path in the ring operation mode.

4. The method according to claim 1, wherein the second service signal path further comprises an add-drop & through path in addition to the first

subscriber service path.

5. The method according to claim 4, wherein the second service signal path supports a through path, an east-west add-drop & through path, and a west-east add-drop & through path in the system of the ADM operation mode.

6. The method according to claim 5, wherein the east-west add-drop & through path drops a path signal received from the east to the subscriber service processing unit, adds the path signal received from the subscriber service processing unit to the west, and passes the path signal received from the west through the east.

7. The method according to claim 5, wherein the west-east add-drop & through path drops a path signal received from the west to the subscriber service processing unit, adds the path signal received from the subscriber service processing unit to the east, and passes the path signal received from the east through the west.

8. The method according to claim 4, wherein the second service signal path supports a through path, ring add-drop path, east-west add-drop & through path, and west-east add-drop & through path in the system of the ring operation mode.

9. The method according to claim 1, wherein the message transmission channel uses K1 and k2 bytes of the overhead of a STM-n signal.

10. The method according to claim 9, wherein the K1 byte comprises:
a protection request signal; and
an Id of a remote system for carrying out a protection request.

11. The method according to claim 10, wherein the protection request signal comprises:

a no request signal representing that it is unnecessary to carry out protection;

10 a switch signal for switching only the direction of a signal path;

a round signal for assuring the continuity of a receiving signal;

15 a reverse request switch signal which is a response signal to the switch signal,

a reverse request round signal which is a response signal to the round

signal; and

20 a manual switch signal which is a manual path switch request.

12. The method according to claim 9, wherein the K2 byte comprises:

a system status signal for checking the status of a local system by a

25 remote system; and

a local system Id.

13. The method according to claim 12, wherein the system status signal comprises:

25 an idle signal representing a normal state;

- a rounded signal representing the state in which switch protection is carried out;
- a manual switched signal representing the state in which manual path protection is carried out;
- 5 a remote defect indication(RDI) signal notifying that a remote system signal has a defect;
- a signal fail(SF) signal representing the direction in which a fail is detected and an auto protection message is forwarded; and
- 10 an initialization signal representing that a system is in the initialization state.

14. The method according to claim 1, wherein the step of protecting the new path is carried out only in the system of the ring operation mode.

15. 15. The method according to claim 1, wherein, in the step of protecting the new path, a message for protection is transmitted in a single direction, and the system status is transmitted in both directions.

16. The method according to claim 15, wherein the system having received the protection request signal delivers a response signal notifying the system having transmitted the request signal that the protection request signal has been normally carried out

17. The method according to claim 16, wherein the system having received the response signal stops the delivering of the protection request signal.

18. The method according to claim 1, wherein, in the step of protecting the new path, all systems before detecting a fail or carrying out protection are in the idle state, and all systems in the idle state delivers a no request signal(NRS).

19. The method according to claim 1, wherein, in the step of protecting the new path, all fails that can be recognized by a system are represented as a signal fail(SF), said SF including all fails that can affect path signal services.

10 20. The method according to claim 19, wherein the system having detected the SF delivers a status message of remote detect indication(RDI) in the direction of detecting the SF, and delivers a SF signal in the opposite direction, thus making an adjacent system understand its status.

15 21. The method according to claim 19, wherein the system having detected the SF delivers a protection request signal for carrying out protection of "ring add-drop & through path" in the opposite direction of the direction of detecting the SF.

20 22. The method according to claim 19, wherein the system having detected the SF carries out protection of "ring add-drop path" in the opposite direction of the direction of detecting the SF, and changes the opposite direction of the direction of detecting the fail to "signal fail state(SF state)", and changes the direction of detecting the fail to "remote defect indication state(RDI state).

23. The method according to claim 19, wherein the system having detected the SF does not deliver a protection request signal in the direction of detecting the SF.

24. The method according to claim 24, wherein the system having received the RDI signal carries out path protection in the opposite direction of the direction of receiving the RDI signal, and changes its status to the switched state.

25. The method according to claim 24, wherein the system that has already carried out the protection to be in the switched state carries out protection by checking its status upon receipt of a different path protection request signal.

26. The method according to claim 20, wherein the system having received the RDI signal does not deliver any protection request signal to the system disposed in the opposite direction of the direction of receiving the RDI signal.

27. The method according to claim 20, wherein the system having received the RDI signal does not deliver a protection request signal to the next system